NATIONAL ENERGY TECHNOLOGY LABORATORY

DOE FEMP/U. S. Forest Service, Bureau of Land Management Collaborative Effort to Convert Woody Biomass to Heat and Power

Craig Hustwit, Ed Gee, Henry Bastian, Falene Haven

U.S. DEPARTMENT OF ENERGY

FEMP/FS/BLM Collaborative Biomass Effort

- **Woody Biomass Utilization Working Group, WoodyBUG, coordinates efforts by all agencies to identify beneficial uses of woody biomass residues.**
- **In FY2010 WoodyBUG Work Plan an item was included to increase the amount of woody biomass residues at Forest Service and BLM sites to generate heat and power.**
- **A letter was sent out to all FS regions and forests encouraging participation in such an effort.**
- **Individual BLM state offices were also contacted.**

FEMP/FS/BLM Collaborative Biomass Effort

Each National Forest and BLM site was went the following questionnaire:

- ***Does the site have an available biomass feedstock?***
- ***Are their multiple biomass suppliers in the area?***
- ***Is transportation infrastructure in place?***
- ***Does the site have local environmental group support?***
- ***Does the site have local community support?***
- ***Did the site participate in the CROP study?***
- ***Does the site have Line Officer support?***
- ***Will the Forest Service, Bureau of Land Management, a Tribal Nation, Department of Defense, or another federal agency also participate in a project?***

Only sites that could answer in the affirmative to all questions were given further consideration

FEMP/FS/BLM Collaborative Biomass Effort

- **We expected between 2 and 12 requests for Biomass Feasibility Studies.**

- **We received 120 responses!**

Facility Survey Questionnaire

A facility survey was then sent to the responding sites:

- **Site:**
- **FS Region:**
- **Contact Name/Energy Manager:**
- **Title:**
- **Address:**
- **Telephone:**
- **Fax:**
- **Email:**

Facility Survey Questionnaire

Forest Service Information

- Who are the key decision makers in your organization?
- What other renewable energy resources are you investigating?
- Describe areas around your site
- Are there any regulatory of other external barriers that prevent this project from moving forward?
- Does facility have local environmental support?
- Did the facililty participate in the CROP study?
- Are line officers on board?

Facility Survey Questionnaire

Site Information

- **Site Description**
- **Site Location**
- **Operational Information**
  - Operating hours per day
  - Operating hours per week
  - Operating hours per year
- **Any seasonal considerations?**
- **Andy special considerations: space, land use restrictions, noise issues**
- **Altitude**
- **Summer Design Temp.**
- **Winter Design Temp.**
- **Total Land owned by site**

Facility Survey Questionnaire

Electric Service

- Servicing Utility
- Service voltage
- Applicable Rate Schedule
- Utility Contact
- Annual consumption
- Annual Cost
- Peak Demand
- Average Demand
- Average and Peak Demand by month
- Consumption by month

Facility Survey Questionnaire

Electric Load Information

- Does the facility have internet access to real time consumption
- Transportation/service voltage
- Number of service drops
- No. of electric meters
- Distance to closest substation
- Power Quality problems?
- Momentary Power Outages?
- Sustained Power Outages?
- Back-up generators?
- Power Factor

Facility Survey Questionnaire

Fuel Use

- Primary fuel
- Utility or Supplier
- Applicable rate schedule
- Is commodity purchased under a supply contract
- Current delivered fuel price
- Annual fuel consumption (MMBtu or therms)
- Annual fuel cost
- National Gas supply pressure
- Previous 12 months of fuel bills
- Secondary fuels: type, annual use, units
- Breakdown of annual fuel consumption: process steam, space heating, domestic hot water, other

Facility Survey Questionnaire

Thermal Loads

- Description of major thermal loads
- Max. steam demand
- Avg. steam demand
- Required steam conditions, i.e. temp, press.
- Max. Hot Water Demand
- Avg. Hot Water Demand
- Required Hot Water Conditions
- Boiler Efficiency
- Max. cooling load
- Thermal load profiles

Facility Survey Questionnaire

Existing Equipment

- **What size and type of Existing Heating Equipment are installed?**
- **Heating Systems Profile, i.e. Capacity, efficiency, fuel**
- **What percentage of condensate return is returned to the boiler(s)?**
- **What is the condensate return temperature?**
- **Does the facility have Chilled Water Distribution System**
- **Profile of Existing Chillers**

Facility Survey Questionnaire

Biomass Information

- Does the site currently administer any stewardship contracts?
- What are the quantity of the contracts in tons/year
- Does the facility have multiple feedstock suppliers?
- Provide list of suppliers
- Provide FS annual thinnings quantities for the year
- What are the local biomass fuel sources, i.e. forestry, agricultural, industrial
- Are there any aggregators in the your area?
- What is the prevailing rate for woody biomass in your area?

Facility Survey Questionnaire

Transportation

- What is the site's accessibility to major roadways?
- Are any other modes of transportation available, i.e. rail, barge
- How far will biomass need to be transported?

FEMP/FS/BLM Collaborative Biomass Effort

- We gave a December 5th deadline for submitting the filled out questionnaire. Some respondents were able to do this. Some weren't.

- We had $600,000 in ARRA funding to conduct the Biomass Feasibility Assessments. Based on the funding level we decided that we could do 50 site assessments.

- In the end 2 sites dropped out and we conducted 48 site assessments.
- It is likely that we will recommend that all 48 sites move forward as ESPC projects.

FEMP/FS/BLM Collaborative Biomass Effort

Keys to Success

- **We had WO champions at USDA and BLM**
- **We had regional and individual forest champions**
- **We knew that each site had local environmental group and public support for a project**
- **We knew that each site had excess biomass residues and wanted to do a project**
- **We sent inspection teams to each site to verify questionnaire info., fill in data gaps, and interview key personnel**
- **Good communication**

FEMP/FS/BLM Collaborative Biomass Effort

The current estimate is that as ESPC projects there will be 430 short term jobs created (design and construction) and 280 long term jobs (operations).

Pending availability of funding we have ~50 additional Forest Service, Bureau of Land Management, and tribal sites interested in have Biomass Feasibility Studies done